The Pyrenean glaciers (South West Europe) in 1850 and 2011: a new cross-border inventory based on aerial images and field surveys

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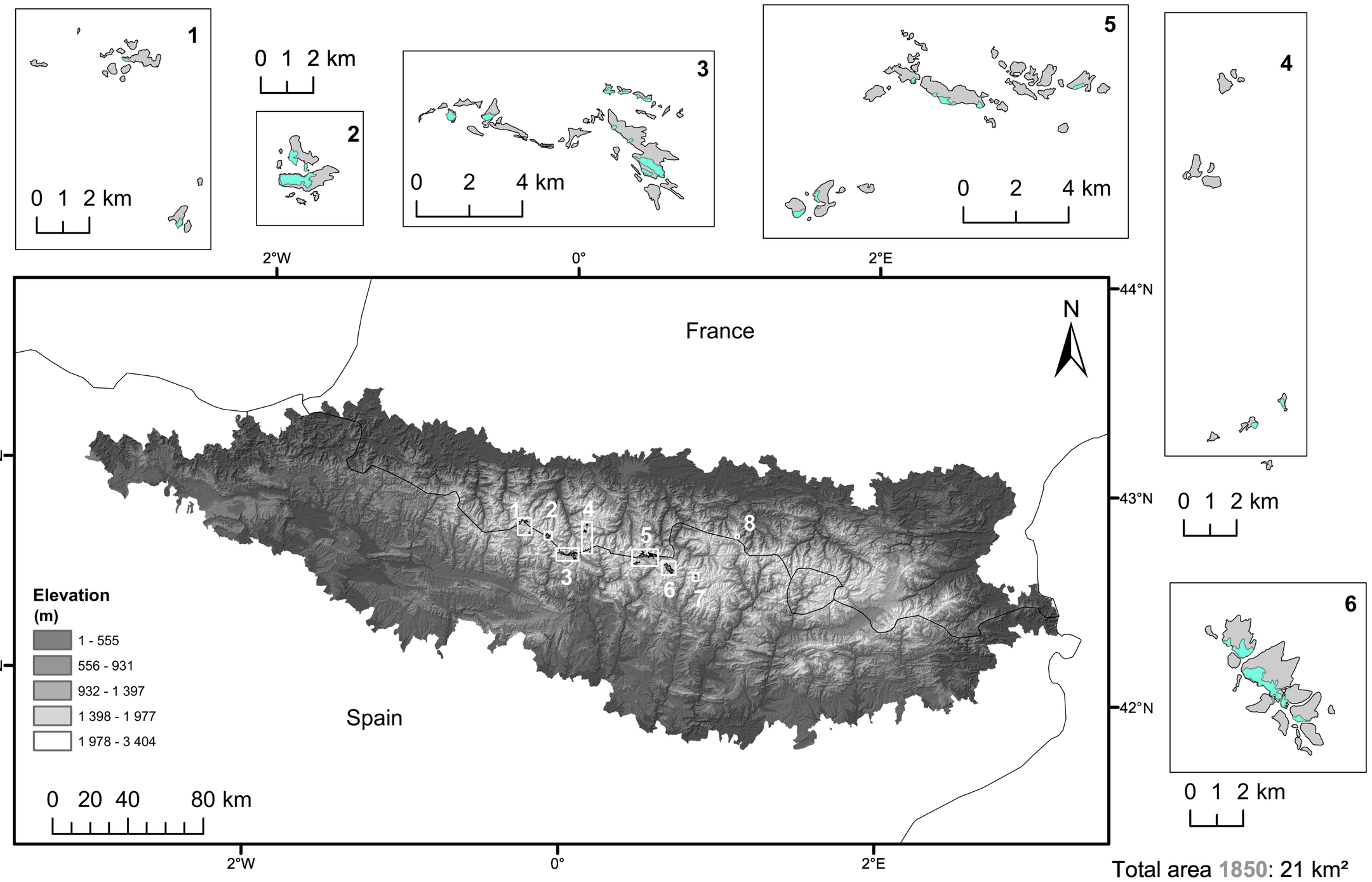
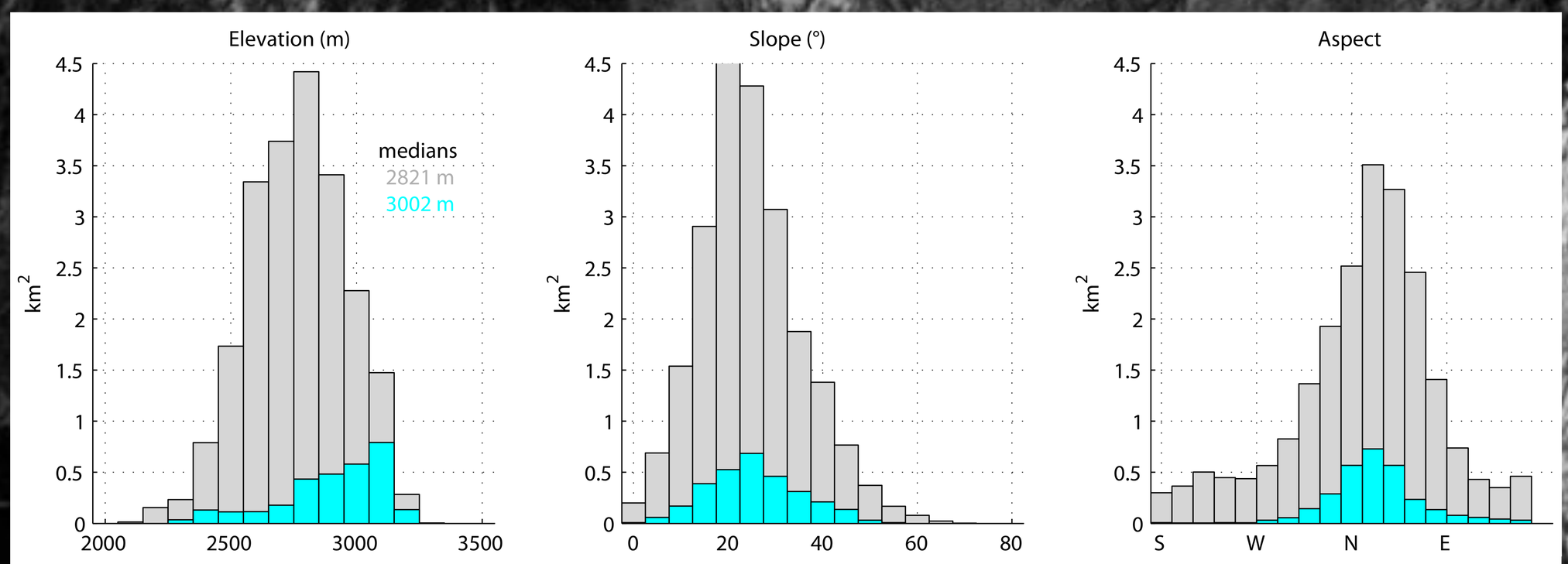
Based on aerial ortho-images (resolution of 0.5 m) from the Spanish and French National cartographic institutes acquired in summer 2010 and 2012, we outline all known glaciers in the Pyrenees. This resolution was adapted to the small size of the glaciers in the area (< 1 km²). In addition, field surveys helped us to determine or modify glaciers front positions at the end of the 2011 hydrological cycle (i.e. 1st October 2011).



Localization of the current Pyrenean glaciers (2011) and estimated outlines at the end of the little ice age (1850). From West to East, the massif names are Balaïtous and Infierno (1), Vignemale (2), Gavarnie and Monte-Perdido (3), Pic-Long and Munia (4), Posets and Perdiguère (5), and Aneto (6). The easternmost glaciers are not detailed, due to their geographical isolation and relative small size, Besiberri (7) and Valier glaciers (8).

An unambiguous shrinkage towards the highest part of the glaciated cirques

From the 107 nominal glaciers that were listed in the RGI v4.0, only 31 glaciers are actual glaciers in 2011. In 1850, the total glaciated area in the Pyrenees was around 21 km², in 2011 it was 3 km². This dataset provides a basis to study the fate of the glaciers in the Pyrenees, including the 80 Pyrenean glaciers that vanished from the previous inventories.



Glaciated area distributions according to the SRTM (30 m) elevation, the slope and the aspect: 2011 and 1850.